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DE astronomer looks to stars to fulfill goals

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KIRTLAND AIR FORCE BASE, N.M. – An astronomer with the Air Force Research Laboratory's Directed Energy Directorate recently achieved the second of his three lifetime astronomical goals.

On Nov. 18, Jack D. Drummond of the Starfire Optical Range had a clear night to observe this year's Leonids meteor shower, possibly the most spectacular shower of its type in more than 33 years. Meterorites fell at the rate of 1,000 an hour for short periords during early morning hours.

A typical meteor storm produces about 100 meteors an hour, but an increase in dust from the comet Tempel-Tuttle enhanced this year's celestial display. Though the last 33-year cycle storm occurred in 1966, with 200,000 meteors an hour visible over New Mexico, scientists have recently been able to more accurately predict the Leonids activities.

Drummond called the dispay "the best meteor shower I've ever seen."

Of special interest to Drummond are the lingering trails left in the wake of these meteors, which the University of Virginia graduate calls "glowworms in the sky."

"Normally, the trails last for a few seconds, but those associated with the Leonids can last up to an hour," he explained.

A self-sustaining catalytic process called chemiluminescence creates these trails. During the process, the element sodium is not destroyed but converts ozone to diatomic oxygen thus emitting light.

The process is similar to the flickering light from lightning bugs, called bioluminescence. "Glowworms are the larvae of lightning bugs and that's how I came up with the name," explained the former U. S. Navy pilot.

Drummond, a graduate of New Mexico State with a degree in advanced astronomy, and other scientists at the adaptive optics research facility are interested in this phenomenon because it primarily involves sodium with which they hope to create a guide star for their research.

During the last three years, Drummond directed sodium lidar, a laser operating at visible wavelengths, to gather data from the lingering trails. The laser equipment, from the University of Illinois, is not available this year but he will continue his observation as a "meteor spotter" during a spectro-photometric experiment directed by Air Force reservist Lt. Col. David Barnaby, an astronomer at Western Kentucky University.

In 1991, the Astronomical Union honored Drummon by having an asteroid named after him, thereby giving him his first astronomical goal. His third is to witness a daytime fireball.

His 3-kilometer (1.8 mile) wide asteroid (4693) Drummond permanently orbits the Main Belt between Mars and Jupiter. The rare and spectacular daylight fireballs involve larger or rock-sized objects spawned from asteroids compared to the much smaller, comet-spawned meteors. They often make loud sounds when they fall or explode. **@**